

FORM PTO-1390 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

219902US0XPCT

DESIGNATED/ELECTED OFFICE (DO/EO/US)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

CONCERNING A FILING UNDER 35 U.S.C. 371

10/070817

INTERNATIONAL APPLICATION NO.

PCT/EP00/06501

INTERNATIONAL FILING DATE

8 July 2000

PRIORITY DATE CLAIMED

9 September 1999 (earliest)

TITLE OF INVENTION

ANTIMICROBIAL ADDITIVES

APPLICANT(S) FOR DO/EO/US

SOSNA Friedrich et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:



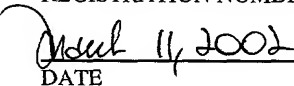
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☐ Other items or information:

Notice of Priority/PCT/IB/308/Application Data Sheet (2 pages)

Form PTO-1449/Letter Regarding Translation of Annexes/Form PTO-1595

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 101.11) 10/070817		INTERNATIONAL APPLICATION NO. PCT/EP00/06501		ATTORNEY'S DOCKET NUMBER 219902US0XPCT																																																											
24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY																																																											
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b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.																																																															
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed.																																																															
d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.																																																															
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.																																																															
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<div> 22850</div>			<div> SIGNATURE William F. Obolon NAME Registration Number 30,995 24,618 REGISTRATION NUMBER  DATE</div>																																																												

219902US-0XPCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
FRIEDRICH SOSNA ET AL : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT NO/EP00/06501)
FILED: HEREWITH : EXAMINER:
FOR: MICROBICIDAL ADDITIVES :

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows.

IN THE CLAIMS

Please amend the claims as shown on the marked-up copy following this amendment to read as follows:

3. (Amended) The antimicrobial polymer blend as claimed in claim 1, characterized in that the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylaminopropyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylaminopropylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

4. (Amended) The antimicrobial polymer blend as claimed in claim 1, characterized in that the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylaminopropyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylaminopropylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

5. (Amended) The antimicrobial polymer blend as claimed in Claim 1, characterized in that the other polymer used comprises polyurethanes, polyolefins, polyethylene, polypropylene, poly-siloxanes, polystyrene, polyacrylates, polymethylmethacrylate, PVC, polyamides or polyterephthalates.

6. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 for producing items for medical technology.

7. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 for producing hygiene items.

8. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 in surface coatings, protective paints, or other coatings.

9. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 in biocidal formulations.

10. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 for producing films, tarpaulins, fabrics, or fibers.

11. (Amended) The use of the antimicrobial polymer blends as claimed in Claim 1 in formulations for ointments or pastes.

12. (Amended) A process for sterilizing cooling water streams, which comprises

adding antimicrobial polymer blends as claimed in Claim 1 in dispersed form to the cooling water.

REMARKS

Claims 1-12 are active in the present application. Claims 3-12 have been amended to remove multiple dependencies. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
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Serial No: _____

Amendment Filed on: _____

3/11/02

IN THE CLAIMS

--3. (Amended) The antimicrobial polymer blend as claimed in claim 1[or 2], characterized in that the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylaminopropyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylaminopropylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

4. (Amended) The antimicrobial polymer blend as claimed in claim 1[or 2], characterized in that the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylaminopropyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylaminopropylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

5. (Amended) The antimicrobial polymer blend as claimed in [any of claims 1 to 5] Claim 1, characterized in that the other polymer used comprises polyurethanes, polyolefins,

polyethylene, polypropylene, poly-siloxanes, polystyrene, polyacrylates, polymethylmethacrylate, PVC, polyamides or polyterephthalates.

6. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 for producing items for medical technology.

7. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 for producing hygiene items.

8. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 in surface coatings, protective paints, or other coatings.

9. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 in biocidal formulations.

10. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 for producing films, tarpaulins, fabrics, or fibers.

11. (Amended) The use of the antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 in formulations for ointments or pastes.

12. (Amended) A process for sterilizing cooling water streams, which comprises adding antimicrobial polymer blends as claimed in [any of claims 1 to 5] Claim 1 in dispersed form to the cooling water.--

O.Z. 5586-WO

Antimicrobial additives

The invention relates to antimicrobial polymers obtained by polymerizing acryloxyalkylamines. The invention further relates to a process for preparing these antimicrobial polymers and to their use.

It is highly undesirable for bacteria to become established or to spread on the surfaces of piping, or of containers or packaging. Slime layers frequently form and permit sharp rises in microbial populations, and these can lead to persistent impairment of the quality of water, drinks or foods, and even to spoilage of the product and harm to the health of consumers.

Bacteria must be kept away from all fields of life where hygiene is important. This affects textiles for direct body contact, especially in the genital area, and those for the care of the elderly or sick. Bacteria must also be kept away from surfaces of the furniture and equipment used in patient-care areas, especially in areas for intensive care or neonatal care, and in hospitals, especially in the areas where medical intervention takes place, and in isolation wards for critical cases of infection, and also in toilets.

A current method of treating equipment, or the surfaces of furniture or of textiles, to resist bacteria either when this becomes necessary or else as a precautionary measure, is to use chemicals or solutions or mixtures of these which are disinfectants and therefore have fairly broad general antimicrobial action. Chemical agents of this type act nonspecifically and are frequently themselves toxic or irritant, or form degradation products which are hazardous to health. In addition, people frequently exhibit intolerance to these materials once they have become sensitized.

Another method of counteracting surface spread of

bacteria is to incorporate substances with antimicrobial action into a matrix.

US-A 4 532 269, for example, discloses a terpolymer made from butyl methacrylate, tributyltin methacrylate, and tert-butylaminoethyl methacrylate. This copolymer is used as an antimicrobial paint for ships, and the hydrophilic tert-butylaminoethyl methacrylate present promotes gradual erosion of the polymer and thus releases the highly toxic tributyltin methacrylate, which is the antimicrobial active ingredient.

In these applications, the copolymer prepared with aminomethacrylates is merely a matrix or carrier for added microbicidal ingredients which can diffuse or migrate out of the carrier material. Sooner or later, polymers of this type lose their activity, once the necessary minimum inhibitor concentration (MIC) at the surface has been lost.

US 4 389 502 discloses a polymer composition which comprises polyester, polymethyl methacrylate, cellulose acetate butyrate, and poly(tert-butylaminoethyl methacrylate).

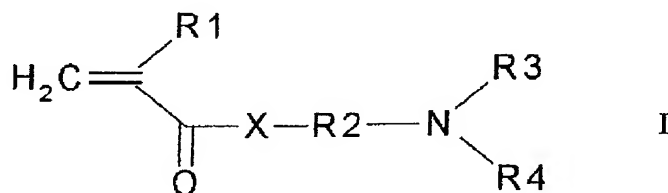
The European patent application 0 862 858 has also disclosed that copolymers of tert-butylaminoethyl methacrylate, a methacrylate with a secondary amino function, has inherent microbicidal properties. Systems developed in the future will again have to be based on novel compositions with improved effectiveness if undesirable resistance phenomena in the microbes are to be avoided, particularly bearing in mind the microbial resistance known from antibiotics research.

The object on which the present invention was based was therefore to develop novel antimicrobial polymers. When used as a coating or covering material, these should prevent bacteria from colonizing surfaces and spreading thereon.

Surprisingly, it has now been found that

homopolymerization of acryloxyalkylamines or of methacryloxyalkylamines gives polymers which are lastingly microbicidal, are not damaged by solvents or physical stresses, and exhibit no migration. There is
5 no need here for the use of other biocidal active ingredients. The surface of the polymers is, of course, important for the antimicrobial action of these homopolymers.

The present invention therefore provides antimicrobial
10 polymer blends where one or more antimicrobial polymers which are obtained by polymerizing a monomer of the formula I



15 where

R1 = -H or -CH₃

R2 = branched or unbranched aliphatic hydrocarbon radical having from 1 to 5 carbon atoms,

20 R3 = H, or branched or unbranched aliphatic hydrocarbon radical having from 1 to 7 carbon atoms,

R4 = H, or branched or unbranched aliphatic hydrocarbon radical having from 1 to 7 carbon atoms,

R5 = H, or branched or unbranched aliphatic hydrocarbon radical having from 1 to 7 carbon atoms, and

25 X = O, NH, NR5

are mixed with at least one other polymer other than cellulose acetate butyrate and polyester.

30 Acryloyloxyalkylamines (X = O) and alkylaminoacrylamides (X = NH) are particularly suitable for preparing the antimicrobial polymers.

The radicals R3 and R4 may be identical or different. If R3 and/or R4 are hydrocarbon groups, these may in particular be methyl, ethyl, isopropyl, n-propyl, or

tert-butyl groups.

Preferred monomers used of the formula I are 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylaminopropyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylaminopropylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

The antimicrobial polymers may be obtained by homopolymerizing monomers of the formula I. The free-radical polymerization advantageously takes place by a chemical route by way of a free-radical initiator, or initiated by radiation. The examples describe typical procedures.

25

Examples of blend material, i.e. other polymer with which the antimicrobial polymer is mixed, are polyurethanes, PVC, polyolefins, such as polyethylene or polypropylene, polysiloxanes, polystyrenes, polyacrylates, polymethacrylates, and engineering plastics, e.g. polyamides or polyterephthalates. To obtain adequate antimicrobial action of a polymer blend, the proportion of the antimicrobial polymer of the invention should be from 0.2 to 90% by weight, preferably from 40-90% by weight.

In principle, any of the processes known in the art,

for example as described in detail by H.-G. Elias, Makromoleküle [Macromolecules], Vol. 2, 5th edition, pp. 620 et seq., may be used to prepare the antimicrobial polymer blends. For example, two
5 previously formed polymers are mixed in the melt by mixing the pelletized or pulverulent polymers on roll mills, in kneaders, or using extruders. In the case of thermoplastics, this is achieved by heating above the glass transition temperatures or melting points. In the
10 case of solution mixing, the starting materials are separately prepared solutions of the two polymers in the same solvent.

In specific embodiments of the present invention, it is
15 possible for the proportion of the one or more antimicrobial polymers in a blend to be less than 40-90% by weight, e.g. from 0.2 to 70% by weight, preferably from 0.2 to 30% by weight, particularly preferably from 0.2 to 15% by weight, very particularly
20 preferably from 0.2 to 10% by weight.

One preferred process for preparing the antimicrobial polymers and, respectively, polymer blends is free-radical polymerization of monomers of the formula I in
25 solution, using a free-radical initiator. The resultant antimicrobial polymers may, where appropriate after mixing with other polymers, be applied to a surface by known methods, such as dipping, spraying, or spreading. Solvents which have proven successful are ethanol,
30 methanol, water/alcohol mixtures, methyl ethyl ketone, diethyl ether, dioxane, hexane, heptane, benzene, toluene, chloroform, dichloromethane, tetrahydrofuran, and acetonitrile, but it is also possible to use other solvents as long as they have sufficient capability for
35 dissolving the polymers and give good wetting of the substrate surfaces. Solutions with polymer contents of from 3 to 20% by weight, for example about 5% by weight, have proven successful in practice and

generally give, in a single pass, coherent coatings which cover the substrate surface and may have a thickness of more than 0.1 μm .

- 5 It is also possible for the antimicrobial polymer blends of the invention to be in the form of a melt when applied to the substrates, e.g. by coextrusion, or by way of dipping, spraying, or surface-coating.
- 10 The antimicrobial polymer blends of the invention may moreover also be used as additives or components for formulating polymer blends, inks or paints, surface coatings, or biocides.
- 15 In the case of the polymer blends, a particularly advantageous method is compounding by way of extrusion, where appropriate also by way of coextrusion with other polymers.
- 20 If polymer blends of the invention are used as an additive or component in inks or paints, surface coatings, or biocides, much lower concentrations may be sufficient, e.g. in the range of a few parts per hundred or per thousand.

25

Use of the modified polymer substrates

- The present invention further provides the use of the antimicrobial polymer blends of the invention for producing antimicrobial products, and the resultant
- 30 products per se. The products may comprise antimicrobial polymers of the invention or consist of these. Products of this type are preferably based on polyamides, on polyurethanes, on polyether block amides, on polyesteramides or -imides, on PVC, on
- 35 polyolefins, on silicones, on polysiloxanes, on polymethacrylate, or on polyterephthalates, which have surfaces coated with polymers of the invention or have been processed using polymers of the invention, in the

form of a polymer blend.

Examples of antimicrobial products of this type are machine parts for processing food and drink, components
5 in air conditioning systems, roofing, items for bathroom and toilet use, kitchen items, components for sanitary installations components of animal cages or of animal houses, recreational products for children, components of water systems, packaging for food or
10 drink, operator units (touch panels) of devices, and contact lenses.

The polymer blends of the invention may be used anywhere where importance is placed on surfaces which
15 are as free as possible from bacteria, i.e. are microbicidal, or on surfaces with release properties. Examples of applications of the polymer blends of the invention are in particular surface coatings, protective paints, and other coatings in the following
20 sectors:

- marine: boat hulls, docks, buoys, drilling platforms, ballast water tanks
- construction: roofing, basements, walls, facades,
25 greenhouses, sun protection, garden fencing, wood protection, tent roof material, fabrics
- sanitary: public conveniences, bathrooms, shower curtains, toilet items, swimming pools, saunas, jointing, sealing compounds
- 30 - requisites for daily life: machines, kitchen, kitchen items, sponge pads, recreational products for children, packaging for food or drink, milk processing, drinking water systems, cosmetics
- machine parts: air conditioning systems, ion
35 exchangers, process water, solar-powered units, heat exchangers, bioreactors, membranes
- medical technology: contact lenses, diapers, membranes, implants

- consumer articles: automobile seats, clothing (socks, sports clothing), hospital equipment, door handles, telephone handsets, public conveyances, animal cages, cash registers, carpeting, wallpapers.

5

The polymer blends may likewise be used as an additive for surface coatings in the maritime sector, in particular for eliminating larval barnacles on boat hulls, and generally as an additive in antifouling
10 paints, particularly in sea water in which salt is present.

The antimicrobial polymer blends of the invention may also be used as additives in formulating cosmetic
15 products, e.g. for pastes or ointments. Here the proportion of polymer blends of the invention may be lowered as far as relatively small numbers of parts per hundred or parts per thousand, depending on the activity of the polymer and the formulation.

20

The polymer blends of the invention are also used as a biofouling inhibitor in cooling circuits. To prevent damage to cooling circuits by infestation with algae or bacteria, the circuits would have to be cleaned
25 frequently or appropriately oversized. In open cooling systems, as are usually found in power plants and in chemical plants, the addition of microbicidal substances such as formalin is not possible. Other microbicidal substances are frequently highly corrosive
30 or form foams, preventing their use in systems of this type.

In contrast, it is possible for polymer blends of the invention to be fed with the other polymers mentioned
35 in finely dispersed form into the process water. The bacteria are killed on contact with the antimicrobial polymers and, if necessary, removed from the system by filtering off the dispersed blend. Deposits of bacteria

or algae on sections of the plant can thus effectively be prevented. The result of this is a completely novel process for eliminating or reducing biofouling in process water systems.

5

The present invention therefore also provides a process for sterilizing cooling water streams, by adding antimicrobial polymers or polymer blends of these in dispersed form to the cooling water. For the purposes
10 of the present invention, cooling water includes any process water stream which is used for heating or cooling purposes in closed or open circulating systems.

The dispersed form of the blends may be obtained in the
15 preparation process itself, e.g. by emulsion polymerization, precipitation polymerization, or suspension polymerization, or subsequently by comminuting, e.g. in a jet mill. The size distribution of the resultant particles when they are used is
20 preferably from 0.001 to 3 mm (diameter of particles), firstly providing a large surface for killing the bacteria or algae and secondly enabling, if required, ready separation from the cooling water, e.g. by filtration. One way of working the process is to remove
25 from the system continuously a proportion (5 to 10%) of the blends used and to replace it with an appropriate amount of fresh material. As an alternative, the number of microbes in the water may be checked, and further antimicrobial copolymer/blend added as required.
30 Depending on the quality of the water, it is sufficient to use from 0.1 to 100 g of antimicrobial blend per m³ of cooling water.

The present invention also provides the use for
35 producing hygiene products or items for medical technology, of the polymer substrates modified on the surface using polymer blends of the invention. The statements above concerning preferred materials are

again applicable. Examples of hygiene products of this type are toothbrushes, toilet seats, combs, and packaging materials. For the purposes of the present invention, hygiene items also include articles which
5 can come into contact with many people, for example telephone handsets, stair rails, door handles, window catches, and also grab straps and grab handles in public conveyances. Examples of items for medical technology are catheters, tubing, protective or backing
10 films, and also surgical instruments.

15 The examples below are given for further description of the present invention, but are not intended to limit the scope of the invention as set out in the claims.

Example 1:

20 60 ml of 2-diethylaminoethyl methacrylate (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.74 g of azobisisobutyronitrile dissolved in 20 ml of ethyl
25 methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of demineralized water, whereupon the polymeric product
30 precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours.

35

Example 1a:

0.05 g of the product from example 1 is shaken in 20 ml of a test microbial suspension of Staphylococcus

aureus. After a contact time of 15 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 1b:

0.05 g of the product from example 1 is shaken in 20 ml of a test microbial suspension of Pseudomonas aeruginosa. After a contact time of 60 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

Example 2:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours.

Example 2a:

0.05 g of the product from example 2 is shaken in 20 ml of a test microbial suspension of Staphylococcus aureus. After a contact time of 15 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus

microbes are detectable.

Example 2b:

0.05 g of the product from example 2 is shaken in 20 ml
5 of a test microbial suspension of *Pseudomonas*
aeruginosa. After a contact time of 60 minutes, 1 ml of
the test microbial suspension is removed, and the
number of microbes in the test mixture is determined.
After expiry of this time, the number of microbes has
10 fallen from 10^7 to 10^2 .

Example 3:

20 ml of N-3-dimethylaminopropylacrylamide (Aldrich)
and 70 ml of ethanol are charged to a three-necked
15 flask and heated to 65°C under a stream of argon. 0.2 g
of azobisisobutyronitrile dissolved in 5 ml of ethyl
methyl ketone is then slowly added dropwise, with
stirring. The mixture is heated to 70°C and stirred at
this temperature for 72 hours. After expiry of this
20 time, the reaction mixture is stirred into 0.5 l of
demineralized water, whereupon the polymeric product
precipitates. After separation of the product by
filtration, the filter residue is washed with 100 ml of
a 10% strength solution of ethanol in water in order to
25 remove any residual monomers still present. The product
is then dried in vacuo at 50°C for 24 hours.

Example 3a:

0.05 g of the product from example 3 is shaken in 20 ml
30 of a test microbial suspension of *Staphylococcus*
aureus. After a contact time of 15 minutes, 1 ml of the
test microbial suspension is removed, and the number of
microbes in the test mixture is determined. After
expiry of this time, the number of microbes has fallen
35 from 10^7 to 10^3 .

Example 3b:

0.05 g of the product from example 3 is shaken in 20 ml

- of a test microbial suspension of *Pseudomonas aeruginosa*. After a contact time of 60 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined.
- 5 After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

Example 4:

- 10 10 g of the polymer from example 1 are heated to 165°C . This heated polymer is then mixed with 3 g of polymethyl methacrylate (Aldrich) which had likewise been heated in advance to 165°C . The two polymers are very thoroughly mixed and cooled to room temperature at a rate of 20°C per hour.

15

Example 4a:

- 20 0.05 g of the product from example 4 is shaken in 20 ml of a test microbial suspension of *Staphylococcus aureus*. After a contact time of 15 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

25 Example 4b:

- 30 0.05 g of the product from example 4 is shaken in 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*. After a contact time of 60 minutes, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 .

Example 5:

- 35 90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of

ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 5 g of the product are dissolved in 32 g of diisononyl phthalate. 64 g of polyvinyl chloride pellets are then added to this mixture, and the mixture is intimately mixed until it becomes a paste. 20 g of the resultant paste are applied to a metal sheet, using a doctor, in such a way as to give a layer of 0.7 mm thickness. The sheet covered by the paste is then heated to 200°C for 2 minutes, whereupon the paste gels, giving a plasticized PVC film.

20

Example 5a:

A piece of the plasticized PVC film from example 5, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

30

Example 5b:

A piece of the plasticized PVC film from example 5, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa, and is subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined.

35

After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 6:

- 5 90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with
10 stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by
15 filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 32 g of diisononyl phthalate.
20 64 g of polyvinyl chloride pellets are then added to this mixture, and the mixture is intimately mixed until it becomes a paste. 20 g of the resultant paste are applied to a metal sheet, using a doctor, in such a way as to give a layer of 0.7 mm thickness. The sheet
25 covered by the paste is then heated to 200°C for 2 minutes, whereupon the paste gels, giving a plasticized PVC film.

Example 6a:

A piece of the plasticized PVC film from example 6, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 6b:

A piece of the plasticized PVC film from example 6, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa, and is subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

Example 7:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 5 g of the product are stirred into 95 g of Rowacryl G-31293

acrylic surface coating from the company ROWA.

Example 7a:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm
5 is painted with the acrylic surface coating from
example 7 and then dried for 24 hours at 35°C in a
drying cabinet. This aluminum sheet is placed, with its
coated side upward, on the base of a glass beaker which
contains 20 ml of a test microbial suspension of
10 Staphylococcus aureus, and is subjected to shaking.
After a contact time of 2 hours, 1 ml of the test
microbial suspension is removed, and the number of
microbes in the test mixture is determined. After
expiry of this time, no remaining Staphylococcus aureus
15 microbes are detectable.

Example 7b:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm
is painted with the acrylic surface coating from
20 example 7 and then dried for 24 hours at 35°C in a
drying cabinet. This aluminum sheet is placed, with its
coated side upward, on the base of a glass beaker which
contains 20 ml of a test microbial suspension of
Pseudomonas aeruginosa, and is subjected to shaking.
25 After a contact time of 2 hours, 1 ml of the test
microbial suspension is removed, and the number of
microbes in the test mixture is determined. After
expiry of this time, no remaining Pseudomonas
aeruginosa microbes are detectable.

30

Example 8:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich)
and 180 ml of ethanol are charged to a three-necked
flask and heated to 65°C under a stream of argon.
35 0.745 g of azobisisobutyronitrile dissolved in 20 ml of
ethyl methyl ketone is then slowly added dropwise, with
stirring. The mixture is heated to 70°C and stirred at
this temperature for 72 hours. After expiry of this

time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are stirred into 98 g of Rowacryl G-31293 acrylic surface coating from the company ROWA.

Example 8a:

Using a brush, an aluminum sheet of dimensions 5 × 5 cm is painted with the acrylic surface coating from example 8 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 8b:

Using a brush, an aluminum sheet of dimensions 5 × 5 cm is painted with the acrylic surface coating from example 8 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

Example 9:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 5 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of 10 demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product 15 is then dried in vacuo at 50°C for 24 hours. 5 g of the product are stirred into 95 g of Plextol D 510 from the company PolymerLatex, an aqueous dispersion of a methacrylate-acrylate copolymer.

20 Example 9a:

Using a brush, an aluminum sheet of dimensions 5 × 5 cm is painted with the dispersion from example 9 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, 25 on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture 30 is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 9b:

Using a brush, an aluminum sheet of dimensions 5 × 5 cm 35 is painted with the dispersion from example 9 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a

test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^2 .

Example 10:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are stirred into 98 g of Plextol D 510 from the company PolymerLatex, an aqueous dispersion of a methacrylate-acrylate copolymer.

Example 10a:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the dispersion from example 10 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 10b:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the dispersion from example 10 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^2 .

Example 11:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 1 g of the product is dissolved in 99 g of ethanol. Six cotton pads, each of diameter 3 cm, are immersed for 1 second into this solution, removed, and dried at room temperature for 24 hours.

Example 11a:

Cotton pads from example 11 are inoculated with, respectively, *Chlorella* sp., *Trentepohlia* sp., *Gloeocapsa* sp., *Calothrix* sp., and *Aspergillus niger*.

These specimens are then placed in an incubator for 3 weeks. Unlike control specimens run simultaneously, no growth is detectable on any of the coated absorbent cotton pads.

5

Example 12:

60 ml of 2-diethylaminoethyl methacrylate (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.74 g of
10 azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of
15 demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product
20 is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 10 g of tetrahydrofuran and applied, using a 100 micrometer doctor, to an aluminum sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The sheet is then dried for 24 hours at 50°C.

25

Example 12a:

The aluminum sheet from example 12 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of
30 Staphylococcus aureus, and subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are
35 detectable.

Example 12b:

The aluminum sheet from example 12 is placed, with its

coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Pseudomonas aeruginosa* microbes are detectable.

10 Example 13:

90 ml of 2-tert-butylaminoethyl methacrylate (Aldrich) and 180 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.745 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1 l of demineralized water, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of a 10% strength solution of ethanol in water in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 10 g of tetrahydrofuran and applied, using a 100 micrometer doctor, to an aluminum sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The sheet is then dried for 24 hours at 50°C.

30 Example 13a:

The aluminum sheet from example 13 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are

detectable.

Example 13b:

The aluminum sheet from example 13 is placed, with its
5 coated side upward, on the base of a glass beaker which
contains 20 ml of a test microbial suspension of
Staphylococcus aureus, and subjected to shaking. After
a contact time of 4 hours, 1 ml of the test microbial
10 suspension is removed, and the number of microbes in
the test mixture is determined. After expiry of this
time, no remaining Pseudomonas aeruginosa microbes are
detectable.

Example 14:

15 20 ml of 3-dimethylaminopropyl acrylate (Aldrich) and
70 ml of ethanol are charged to a three-necked flask
and heated to 65°C under a stream of argon. 0.2 g of
azobisisobutyronitrile dissolved in 5 ml of ethyl
methyl ketone is then slowly added dropwise, with
20 stirring. The mixture is heated to 70°C and stirred at
this temperature for 72 hours. After expiry of this
time, the reaction mixture is stirred into 0.5 l of
demineralized water, whereupon the polymeric product
precipitates. After separation of the product by
25 filtration, the filter residue is washed with 100 ml of
a 10% strength solution of ethanol in water in order to
remove any residual monomers still present. The product
is then dried in vacuo at 50°C for 24 hours. 2 g of the
product are dissolved in 10 g of tetrahydrofuran and
30 applied, using a 100 micrometer doctor, to an aluminum
sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The
sheet is then dried for 24 hours at 50°C.

Example 14a:

35 The aluminum sheet from example 14 is placed, with its
coated side upward, on the base of a glass beaker which
contains 20 ml of a test microbial suspension of
Staphylococcus aureus, and subjected to shaking. After

a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are
5 detectable.

Example 14b:

The aluminum sheet from example 14 is placed, with its coated side upward, on the base of a glass beaker which
10 contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 8 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this
15 time, no remaining *Pseudomonas aeruginosa* microbes are detectable.

Example 15:

10 g of the polymer from example 1 are heated to 165°C.
20 This heated polymer is then mixed with 3 g of polymethyl methacrylate (Aldrich) which had likewise been heated in advance to 165°C. The two polymers are very thoroughly mixed, applied to an aluminum sheet with a thickness of 0.5 cm and dimensions 2 x 2 cm, and
25 cooled to room temperature at a rate of 20°C per hour.

Example 15a:

The aluminum sheet from example 15 is placed, with its coated side upward, on the base of a glass beaker which
30 contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this
35 time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 15b:

The aluminum sheet from example 15 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 8 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Pseudomonas aeruginosa* microbes are detectable.

Example 16:

50 ml of dimethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 10 g of tetrahydrofuran and applied, using a 100 micrometer doctor, to an aluminum sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The sheet is then dried for 24 hours at 50°C.

Example 16a:

The aluminum sheet from example 16 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in

the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

5 Example 16b:

10 The aluminum sheet from example 16 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 microbes per ml.

15

Example 17:

20 50 ml of diethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 10 g of tetrahydrofuran and applied, using a 100 micrometer doctor, to an aluminum sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The sheet is then dried for 24 hours at 50°C.

35

Example 17a:

The aluminum sheet from example 17 is placed, with its coated side upward, on the base of a glass beaker which

contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 17b:

The aluminum sheet from example 17 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 microbes per ml.

Example 18:

45 ml of N-3-dimethylaminopropylacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 10 g of tetrahydrofuran and applied, using a 100 micrometer doctor, to an aluminum sheet of 0.5 cm thickness and dimensions 2 x 2 cm. The sheet is then dried for 24 hours at 50°C.

Example 18a:

The aluminum sheet from example 18 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 18b:

The aluminum sheet from example 18 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 8 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 microbes per ml.

Example 19:

10 g of the polymer from example 16 are heated to 165°C . This heated polymer is then mixed with 3 g of polymethyl methacrylate (Aldrich) which had likewise been heated in advance to 165°C . The two polymers are very thoroughly mixed, applied to an aluminum sheet with a thickness of 0.5 cm and dimensions 2×2 cm, and cooled to room temperature at a rate of 20°C per hour.

Example 19a:

The aluminum sheet from example 19 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial

suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

5

Example 19b:

The aluminum sheet from example 19 is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and subjected to shaking. After a contact time of 8 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 microbes per ml.

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Example 20:

50 ml of dimethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 6 g of the product are dissolved in 32 g of diisononyl phthalate. 64 g of polyvinyl chloride pellets are then added to this mixture, and the mixture is intimately mixed until it becomes a paste. 20 g of the resultant paste are applied to a metal sheet, using a doctor, in such a way as to give a layer of 0.7 mm thickness. The sheet covered by the paste is then heated to 200°C for 2 minutes, whereupon the paste

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gels, giving a plasticized PVC film.

Example 20a:

5 A piece of the plasticized PVC film from example 20, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the
10 number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 20b:

15 A piece of the plasticized PVC film from example 20, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa, and is subjected to shaking. After a contact time of 4 hours, 1 ml of
20 the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 microbes per ml.

25 Example 21:

50 ml of dimethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl
30 methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product
35 precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for

24 hours. 2 g of the product are dissolved in 32 g of diisononyl phthalate. 64 g of polyvinyl chloride pellets are then added to this mixture, and the mixture is intimately mixed until it becomes a paste. 20 g of the resultant paste are applied to a metal sheet, using a doctor, in such a way as to give a layer of 0.7 mm thickness. The sheet covered by the paste is then heated to 200°C for 2 minutes, whereupon the paste gels, giving a plasticized PVC film.

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Example 21a:

A piece of the plasticized PVC film from example 21, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

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Example 21b:

A piece of the plasticized PVC film from example 21, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa, and is subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

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Example 22:

50 ml of diethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with

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stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 2 g of the product are dissolved in 32 g of diisononyl phthalate. 64 g of polyvinyl chloride pellets are then added to this mixture, and the mixture is intimately mixed until it becomes a paste. 20 g of the resultant paste are applied to a metal sheet, using a doctor, in such a way as to give a layer of 0.7 mm thickness. The sheet covered by the paste is then heated to 200°C for 2 minutes, whereupon the paste gels, giving a plasticized PVC film.

Example 22a:

A piece of the plasticized PVC film from example 22, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 22b:

A piece of the plasticized PVC film from example 22, dimensions 3 x 3 cm, is placed on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa, and is subjected to shaking. After a contact time of 4 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has

fallen from 10^7 to 10^3 .

Example 23:

50 ml of dimethylaminopropylmethacrylamide (Aldrich)
5 and 250 ml of ethanol are charged to a three-necked
flask and heated to 65°C under a stream of argon. 0.6 g
of azobisisobutyronitrile dissolved in 20 ml of ethyl
methyl ketone is then slowly added dropwise, with
stirring. The mixture is heated to 70°C and stirred at
10 this temperature for 72 hours. After expiry of this
time, the reaction mixture is stirred into 1.5 l of
cyclohexane, whereupon the polymeric product
precipitates. After separation of the product by
filtration, the filter residue is washed with 100 ml of
15 n-hexane in order to remove any residual monomers still
present. The product is then dried in vacuo at 50°C for
24 hours. 5 g of the product are stirred into 95 g of
Rowacryl G-31293 acrylic surface coating from the
company ROWA.

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Example 23a:

Using a brush, an aluminum sheet of dimensions 5×5 cm
is painted with the acrylic surface coating from
example 23 and then dried for 24 hours at 35°C in a
25 drying cabinet. This aluminum sheet is placed, with its
coated side upward, on the base of a glass beaker which
contains 20 ml of a test microbial suspension of
Staphylococcus aureus, and is subjected to shaking.
After a contact time of 2 hours, 1 ml of the test
30 microbial suspension is removed, and the number of
microbes in the test mixture is determined. After
expiry of this time, no remaining Staphylococcus aureus
microbes are detectable.

35 Example 23b:

Using a brush, an aluminum sheet of dimensions 5×5 cm
is painted with the acrylic surface coating from
example 23 and then dried for 24 hours at 35°C in a

drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking.

- 5 After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 .

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Example 24:

- 45 ml of N-3-dimethylaminopropylacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g
15 of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of
20 cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for
25 24 hours. 2 g of the product are stirred into 98 g of Rowacryl G-31293 acrylic surface coating from the company ROWA.

Example 24a:

- 30 Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the acrylic surface coating from example 24 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which
35 contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of

microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

5 Example 24b:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the acrylic surface coating from example 24 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its
10 coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of
15 microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

Example 25:

20 50 ml of dimethylaminopropylmethacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with
25 stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by
30 filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for 24 hours. 5 g of the product are stirred into 95 g of Plextol D 510 from the company PolymerLatex, an aqueous
35 dispersion of a methacrylate-acrylate copolymer.

Example 25a:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm

is painted with the dispersion from example 25 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Staphylococcus aureus*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, no remaining *Staphylococcus aureus* microbes are detectable.

Example 25b:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the dispersion from example 25 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of *Pseudomonas aeruginosa*, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^4 .

Example 26:

45 ml of N-3-dimethylaminopropylacrylamide (Aldrich) and 250 ml of ethanol are charged to a three-necked flask and heated to 65°C under a stream of argon. 0.6 g of azobisisobutyronitrile dissolved in 20 ml of ethyl methyl ketone is then slowly added dropwise, with stirring. The mixture is heated to 70°C and stirred at this temperature for 72 hours. After expiry of this time, the reaction mixture is stirred into 1.5 l of cyclohexane, whereupon the polymeric product precipitates. After separation of the product by filtration, the filter residue is washed with 100 ml of n-hexane in order to remove any residual monomers still present. The product is then dried in vacuo at 50°C for

24 hours. 2 g of the product are stirred into 98 g of Plextol D 510 from the company PolymerLatex, an aqueous dispersion of a methacrylate-acrylate copolymer.

5 Example 26a:

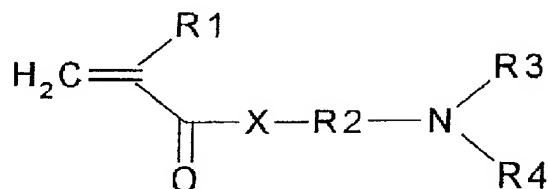
Using a brush, an aluminum sheet of dimensions 5 x 5 cm is painted with the dispersion from example 26 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward,
10 on the base of a glass beaker which contains 20 ml of a test microbial suspension of Staphylococcus aureus, and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture
15 is determined. After expiry of this time, no remaining Staphylococcus aureus microbes are detectable.

Example 26b:

Using a brush, an aluminum sheet of dimensions 5 x 5 cm
20 is painted with the dispersion from example 26 and then dried for 24 hours at 35°C in a drying cabinet. This aluminum sheet is placed, with its coated side upward, on the base of a glass beaker which contains 20 ml of a test microbial suspension of Pseudomonas aeruginosa,
25 and is subjected to shaking. After a contact time of 2 hours, 1 ml of the test microbial suspension is removed, and the number of microbes in the test mixture is determined. After expiry of this time, the number of microbes has fallen from 10^7 to 10^3 .

What is claimed is:

1. An antimicrobial polymer blend,
characterized in that
5 one or more antimicrobial polymers each obtainable
by polymerizing a monomer of the formula I



where

- 10 R1 = -H or -CH₃
R2 = branched or unbranched aliphatic hydrocarbon
radical having from 1 to 5 carbon atoms,
R3 = H, or branched or unbranched aliphatic
hydrocarbon radical having from 1 to 7 carbon
15 atoms,
R4 = H, or branched or unbranched aliphatic
hydrocarbon radical having from 1 to 7 carbon
atoms,
R5 = H, or branched or unbranched aliphatic
20 hydrocarbon radical having from 1 to 7 carbon
atoms, and
X = O, NH, NR5
are mixed with at least one other polymer other
than cellulose acetate butyrate and polyesters.

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2. The antimicrobial polymer blend as claimed in
claim 1,
characterized in that
the polymer blend is composed of from 0.2 to 90%
30 by weight of one or more antimicrobial polymers.
3. The antimicrobial polymer blend as claimed in
claim 1 or 2,
characterized in that

the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylamino-
5 propyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylamino-propylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or N-3-diethylaminopropylacrylamide.

- 10 4. The antimicrobial polymer blend as claimed in claim 1 or 2,
characterized in that

15 the monomer used of the formula I is 2-tert-butylaminoethyl methacrylate, 2-diethylaminoethyl methacrylate, 2-dimethylaminomethyl methacrylate, 2-tert-butylaminoethyl acrylate, 3-dimethylamino-propyl acrylate, 2-diethylaminoethyl acrylate, 2-dimethylaminoethyl acrylate, N-3-dimethylamino-propylmethacrylamide, N-3-diethylaminopropylmethacrylamide, N-3-dimethylaminopropylacrylamide, or
20 N-3-diethylaminopropylacrylamide.

- 25 5. The antimicrobial polymer blend as claimed in any of claims 1 to 4,

characterized in that

the other polymer used comprises polyurethanes, polyolefins, polyethylene, polypropylene, polysiloxanes, polystyrene, polyacrylates, polymethyl
30 methacrylate, PVC, polyamides or polyterephthalates.

- 35 6. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 for producing items for medical technology.

7. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 for producing hygiene items.

8. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 in surface coatings, protective paints, or other coatings.
- 5 9. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 in biocidal formulations.
- 10 10. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 for producing films, tarpaulins, fabrics, or fibers.
- 15 11. The use of the antimicrobial polymer blends as claimed in any of claims 1 to 5 in formulations for ointments or pastes.
- 20 12. A process for sterilizing cooling water streams, which comprises adding antimicrobial polymer blends as claimed in any of claims 1 to 5 in dispersed form to the cooling water.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

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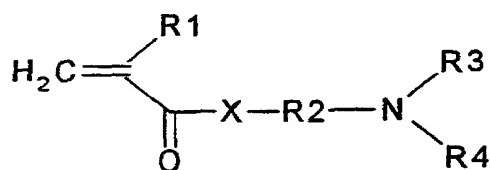
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Zur Erklärung der Zweibuchstaben-Codes, und der anderen
Abkürzungen wird auf die Erklärungen ("Guidance Notes on
Codes and Abbreviations") am Anfang jeder regulären Ausgabe
der PCT-Gazette verwiesen.

(54) Title: MICROBICIDAL ADDITIVES

(54) Bezeichnung: ANTIMIKROBIELLE ZUSATZSTOFFE



atoms, R5 = H, a branched or unbranched aliphatic hydrocarbon radical with between 1 and 7 carbon atoms, X = O, NH, NR5 and by the optional subsequent mixing of said polymers with at least one additional polymer. The microbicidal polymers or polymer blends can be used e.g. as a coating for articles of hygiene or medical articles, or used in lacquers or protective coatings. They can also be used in a method for preventing/reducing biological fouling in water systems.

(57) Abstract: The invention relates to microbicidal polymers and polymer blends, obtained by the polymerization of a monomer of formula (I), wherein R1 = -H or -CH₃, R2 = a branched or unbranched aliphatic hydrocarbon radical with between 1 and 5 carbon atoms, R3 = H, a branched or unbranched aliphatic hydrocarbon radical with between 1 and 7 carbon atoms and R4 = H, a branched or unbranched aliphatic hydrocarbon radical with between 1 and 7 carbon atoms, R5 = H, a branched or unbranched aliphatic hydrocarbon radical with between 1 and 7 carbon atoms, X = O, NH, NR5 and by the optional subsequent mixing of said polymers with at least one additional polymer. The microbicidal polymers or polymer blends can be used e.g. as a coating for articles of hygiene or medical articles, or used in lacquers or protective coatings. They can also be used in a method for preventing/reducing biological fouling in water systems.

(57) Zusammenfassung: Die Erfindung betrifft antimikrobielle Polymere und Polymerblends, die durch Polymerisation eines Monomeren der Formel (I) mit R1 = -H oder -CH₃, R2 = verzweigter oder unverzweigter aliphatischer Kohlenwasserstoffrest mit 1 bis 5 Kohlenstoffatomen, R3 = H, verzweigter oder unverzweigter aliphatischer Kohlenwasserstoffrest mit 1 bis 7 Kohlenstoffatomen und R4 = H, verzweigter oder unverzweigter aliphatischer Kohlenwasserstoffrest mit 1 bis 7 Kohlenstoffatomen, R5 = H, verzweigter oder unverzweigter aliphatischer Kohlenwasserstoffrest mit 1 bis 7 Kohlenstoffatomen, X = O, NH, NR5 und ggf. nachfolgende Vermischung mit mindestens einem weiteren Polymeren hergestellt werden. Die antimikrobiellen Polymere oder Blends können zur Herstellung von Hygieneartikeln oder medizintechnischen Artikeln, z.B. als Beschichtung sowie in Lacken oder Schutzanstrichen verwendet werden. Des weiteren können sie in einem Verfahren zur Vermeidung/Verringerung von Biofouling in Wassersystemen eingesetzt werden.

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Declaration and Power of Attorney for Patent Application

Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

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deren Beschreibung:

☐ ist beigefügt

☐ wurde angemeldet am _____

unter der US-Anmeldenummer oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT)

_____ und am

_____ abgeändert (falls zutreffend)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

the specification of which:

☐ is attached hereto.

☒ was filed on July 8, 2000

as United States Application Number or PCT International Application Number

PCT/EP00/06501 and was amended on

_____ (if applicable).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

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Prior foreign application(s)
(Frühere ausländische Anmeldungen)

199 43 182.5	Germany
(Number)	(Country)
(Nummer)	(Land)
100 22 453.9	Germany
(Number)	(Country)
(Nummer)	(Land)

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority claimed

Priorität
beansprucht

09/09/1999
(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)
09/05/2000
(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

<input checked="" type="checkbox"/>	<input type="checkbox"/>
Yes	No
Ja	Nein
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Yes	No
Ja	Nein

Ich Beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.)
(Aktenzeichen)

(Filing Date)
(Anmeldetag)

(Application No.)
(Aktenzeichen)

(Filing Date)
(Anmeldetag)

Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

PCT/EP00/06501

(Application No.)
(Aktenzeichen)

July 8, 2000

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(Anmeldetag)

pending

(Status) (patented, pending, abandoned)
(Status) (patentiert, schwebend, aufgegeben)

(Application No.)
(Aktenzeichen)

(Filing Date)
(Anmeldetag)

(Status) (patented, pending, abandoned)
(Status) (patentiert, schwebend, aufgegeben)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den (die) nachstehend aufgeführten Patentanwalt (Patentanwälte) und/oder Vertreter mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Angelegenheiten vor dem US-Patent- und Markenamt: (Name(n) und Registrationsnummer(n) auflisten)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

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German Language Declaration

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